

purposes of an oviduct, and of a portion of the middle tubules to those of sperm-ducts is what the observations of Balfour and Semper have established—and more especially the open funnel-like character of the tubules to begin with.

Minor details and important confirmations of the more familiar facts of Vertebrate development I have not space to mention here, the whole series of embryonic phenomena is described with more or less detail by Mr. Balfour, and I have singled out the more striking facts and speculations of the monograph for brief notice.

In commenting on such a work as this, it is strongly brought to one's perception that the method of publication of the results of such laborious investigations is necessarily very imperfect—and subject to a serious deficiency in logical continuity and artistic effect. Mr. Balfour has studied the very widely-diverse phenomena of interest which the developing Elasmobranch presents from the first separation of the egg up to the nearly complete formation of all its organs. In order to state *all* the different results he has obtained, he is obliged, as is usual in embryological monographs, to give them in historical sequence. To the experienced student of embryology this method of statement and the presentation of drawings copied from actual sections and specimens is sufficient. It would be impossible to publish observations within a reasonable period of the date of investigation by pursuing any other method of statement. And yet the monographical and historical method, together with the objective "nature-true" drawings of sections is one which prevents an author from fully exhibiting the import of his observations, and from duly imparting to the reader in a clear and simple form what is, after all, the thing which the reader desires to know, namely, what is the net result of such observations in relation to the great questions of morphology. The fact is, there is no such thing as a science of embryology; it is not even a definite branch of a science. The development of organic form is a necessary part of the science of Organic Morphology, and the results of the study of development can be given with full clearness and in an intelligible manner only when formulated as parts of the general doctrine of the science under which they fall. The conclusion from this is, that the great value of Mr. Balfour's work will not be fully appreciated or rendered clear to the majority of zoological students until they are re-stated, not from the monographical standpoint; but from the more general point of view of Animal Morphology. This more systematic exposition of his Elasmobranch studies and of other like researches in combination with a general survey of the morphology of all groups of the Animal Kingdom as revealed by their developmental histories, we may expect before long to receive from Mr. Balfour himself in the form of a continuation of his well-known *Elements of Embryology*.

E. RAY LANKESTER

OUR BOOK SHELF

Gold. By Edwin W. Streeter, F.R.G.S. Fifth Thousand. (London: Chapman and Hall.)

THE lettering on the cover of the book, as given above will hardly prepare the reader for the statement on the title-page, that the work is a translation and abridgment of Herr von Studnitz' "Die gesetzliche Regelung

des Feingehaltes von Gold und Silber-Waaren," by Mrs. Brewer, with notes and additions by Mr. Streeter.

The work itself contains information which it is useful to possess. It embodies brief abstracts of the law of various countries concerning the standard of gold and silver wares, and discusses the question whether the manufacture of articles in the precious metals should be subject to legal control. Mr. Streeter's notes occupy 10 out of the 150 pages. He states that the system of "Hall-marking" was "instituted on the supposition that the assay and test of precious metals was a matter too recondite to render a power of adequate discrimination for so valuable a transfer of property a thing reasonably to be expected of the public generally."

This is a very obscure way of saying that, as the value of gold and silver wares could not be recognised by inspection, it was advisable that all articles should be stamped by authority. The necessity for such control has long been felt, and it was well justified in 1677 by the author of the "New Touchstone for Gold and Silver Wares," who says: "The truth is, the gain by adulterating gold and silver works is so sweet and enticing that what excuse will not these adulterators find that they may have their unlawful liberty."

In London the control has been wisely vested in the Goldsmiths' Company since the fourteenth century, and in the country there are several assay offices which were reported on by a Select Committee of the House of Commons in 1856. Mr. Streeter urges that gold of one standard only—18 carat—should be used, or that if other alloys are employed the tradesman should "mark them with his own name, state the value of the composite matter, and trust to his genius for the sale." Trusting to genius for the sale of articles is all very well, but the practice of a person stamping the wares he sells with his own mark surely affords no protection against the fraudulent tradesman as the marks are not likely to outlive the age in which they are impressed, and would be as readily counterfeited as those of a responsible authority. It should also be added that the initial or distinctive mark of the maker of an article of gold or silver is already included in the Hall mark.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Alternate and Stereoscopic Vision

WITH reference to Mr. Galton's observation in his instructive paper in *NATURE*, vol. xviii. p. 98, that "sometimes the image seen by the left eye prevails over that seen by the right, and *vice versa*," I may mention that, as I had noticed some years ago, this may be best observed without a stereoscope. If on looking at any object a few feet distant, a nearer object be placed about midway between the first and the eyes, there will of course be two images seen of the near, when the eyes converge on the distant; one of these images seen, say by the right eye, overlaps the distant object as seen by the left eye, and if the two objects be about equally illuminated (or the near one rather the brighter), the overlapping image will alternately solidify and disappear, according to the alternate waxing and waning of sensibility in the eyes. This alternation may be made at will, by desiring to see the near or the distant object; the fluctuations take place about every ten seconds normally, but the changes may be willed (though not so completely) as often as every second.

If the observer can see stereoscopically without an instrument, *i.e.*, can dissociate the usually coincident motions of focussing and convergence, this alternate action of the eyes is seen very

plainly; and not only may stereographs be combined by the eyes, more readily and with less fatigue than when using an instrument, but they may as readily be inverted (the near objects appearing distant, and *vice versa*, as if falsely mounted) by applying each eye to the picture in front of the other, in fact, squinting at it. Thus, pictures of any size can be properly combined by reversing the pictures and crossing the eyes, and the width of the pictures is not limited to the distance between the eyes as in the ordinary way.

An important use of stereoscopic vision is to throw one eye out of use when doing delicate measurement, &c., by directing it to some other and darker object, instead of shutting it; this is less fatigue, and the attention may be willed on to the eye required, so that the image of the other is not noticed, especially if the eyes be changed occasionally.

How far the fact of the eyes changing guard naturally by alternations, may suggest that all duplicated organs of the body have alternate periods of rest, I must leave physiologists to investigate.

W. M. FLINDERS PETRIE

Bromley, Kent

Inside Out

It appears in NATURE, vol. xviii. p. 105, that "if a fourth dimension were added to space, a closed material surface (or shell) could be turned inside out by simple flexure." This implies that flexure is necessary. But without displacing a point or a line in the surface we may consistently suppose a rotation of the normals at each point of it through two right angles in a plane polar to the tangent plane. That seems to do the business.

C. J. MONRO

May 25

Physical Science for Artists

MR. NORMAN LOCKYER, in NATURE, vol. xviii., pp. 59, 60, gives some valuable hints to artists, which, if carried out, will go a great way towards preventing our eyes being hurt by the lunar monstrosities we see at the Royal Academy and elsewhere.

May I be permitted to add a hint which he appears to have overlooked, and that is, that the inside boundary of a crescent moon is an ellipse; and in this consists the peculiar beauty of a true crescent. The usual Turkish crescent is struck with two circles, and always looks gouty and bad. Of course the rough edge of a gibbous moon is also an ellipse.

Scientific Club, 7, Savile Row, W., ROBERT J. LECKY
May 25

Dr. P. P. Carpenter's Collection

MAY I ask you to correct an error in the "Notes" of your number for April 25th, relating to the collection of the late Dr. P. P. Carpenter. This collection was permanently placed by him in the museum of this university; and, mounted under his direction on glass tablets, it now occupies a separate fire-proof room erected for it by the university, and constitutes one of the principal scientific treasures of this university and of Canada. Your correspondent was probably misled by the fact that one of the best duplicate sets was reserved by Dr. Carpenter for his own use in his private residence. This has not been publicly offered for sale, but I believe has been privately offered to certain persons and institutions considered likely to value it.

McGill College, Montreal, May 10 J. W. DAWSON

Menziesia Cærulea

IN confirmation of the recent occurrence of the above plant on the Sow of Athol, I may say that it was gathered by Miss Crawford in 1877, from whom I received a specimen. Like the cotoneaster on the Orme, which has also been reported extinct, careful and prolonged search has generally been rewarded by finding specimens, although the cotoneaster is now very rare. I might take this opportunity of saying that the rare spider orchis, *Ophrys aranifera*, which the Rev. M. J. Berkeley has gathered at Southorpe, in Northants, has been destroyed there by the planting of larch. I made a most careful search not only at Southorpe but on the Barnack hills last week, but without seeing a trace of the orchis, although *Anemone pulsatilla* and *Aceras anthropophora* are still abundant on the unplanted quarries.

Northampton Natural History Society G. C. DRUCE

Landrails

It would prove very interesting to know whether landrails are as plentiful in other parts of the country this season as they are in the neighbourhood of Sheffield. They have not visited us in any numbers since the spring and summer of 1875; in 1876 and 1877 scarcely one was heard; while at the present time we hear their well-known calls in almost every meadow. I know of no migratory British bird in whose case this peculiar irregularity of appearance occurs in such high degree as in the landrail.

If the advice of one interested in the subject may be humbly offered, I would recommend ornithologists to pay strict attention to this matter, this season, with a view of elucidating this peculiar trait in the life-history of this singular bird; for the cause of this irregular appearance has, for aught I know to the contrary, yet to be learned.

CHARLES DIXON

Heeley, near Sheffield, May 20

Hereditary Transmission

THE letter of Mr. Watt reminds me of a similar instance of "Hereditary Transmission" mentioned in the ninth edition of the "Encyclopædia Britannica."

It is there stated that "George Bernhard Bilfinger was born on January 23, 1693, at Cannstadt, in Würtemberg. His father was a Lutheran minister. By a singularity of constitution, hereditary in his family, Bilfinger came into the world with twelve fingers and as many toes."

After being a Professor of Logic at St. Petersburg University Bilfinger became one of the "best and most enlightened ministers" of state that Würtemberg had yet produced.

Burngreave Road, Sheffield,

GEORGE S. WATSON

May 25

THE PHONOGRAPH AND ITS FUTURE

WHAT a surprise is in store for the children next

Christmas if Mr. Edison's expectations are realised. Dolls that can say "papa" and "mamma," will be quite at a discount and will bear much the same relation to the doll of the future that the anthropoid ape does to the man of to-day, and the time will probably have come for some Darwinian toy-maker to write the history of doll development, if, indeed, he does not extend his researches to the whole world of toys. We are promised dolls that can speak, sing, cry, laugh; musical-boxes that will grind out the voice and words of the human singer; locomotives and every other species of "animal and mechanical toy," that will give out their natural and characteristic sounds.

But these are only some of the trifles to which Mr. Edison, in an interesting article in the current *North American Review*, tells us his miraculous invention will certainly or probably be put in the near future. And, indeed, a very little consideration will show that there is no end to the uses to which the principle of the phonograph may be applied; that it may be the means of actually realising some of the wildest dreams and speculations of the "frenzied" poet and preacher, and creating a revolution in human intercourse only to be paralleled by the invention of printing, or even of speech itself. Indeed, at first sight it may seem a step backwards, as it is likely to lead to the abolition, to some extent, of writing and printing, and the substitution of the human voice as the main means of intercourse at a distance. Talk of the solidification of the gases! Why we have here the solidification of something infinitely more impalpable—human words and human thought. We referred above to the musical-box of the future, and this suggests the phonographic barrel-organ, which will doubtless by and by take the place of that instrument of torture which makes the lives of delicate-eared artists and *littérateurs* miserable. Instead of having our musical sensibilities harrowed by a murdered reproduction of our favourite operatic air, or our political sympathies shocked